REMARKS/ARGUMENTS

Claims 1-12 have been amended to overcome the objections noted by the Examiner in the Official Action. In particular, the improper multiple claim dependency has been corrected. Also, the "use" claims, which are proper under European practice, have been converted into "method" claims directed to a method for preventing or treating vascular thrombosis by administering to a subject the particular sulfated polysaccharides. The claims as amended should be free from objection under 35 USC 101 and 35 USC 112.

Turning now to the prior art rejection, the Examiner has rejected claims 1-5, 11 and 12 under 35 USC 102 as being anticipated by WO 097/08206, EP 0 408 770, US 4,533,549 and US 4,713,373.

WO 97/08206 discloses a process for obtaining sulfated polysaccharide fractions with a molecular weight of 10,000 g/mol or less using the free radical depolymerization of a fucan from Phaeophyceae in the presence of a metal catalyst and of hydrogen peroxide. See page 3, line 21 to page 4 line 7. Such sulfated polysaccharide fractions have been shown to exhibit in vitro anticoagulant properties as starting crude fucan. This depolymerization process has been used for the preparation of the sulfated polysaccharide fractions of the present invention. However, this reference does not describe any in vivo antithrombotic effect of the sulfated polysaccharide fractions thus obtained.

EP 0 408 770 relates to a novel sulfated polysaccharide D-HG exhibiting anticoagulant activity prepared by depolymerizing a sulfated polysaccharide FGAG. It also relates to the use of D-HG for preparation of a pharmacological composition for the treatment of disseminated intravascular coagulation syndrome and thrombosis. See page 3, lines 5-24. D-HG is not a fucan derived from Phaeophyceae and is obtained with a process different from that used in the present invention.

US 4,533,549 discloses a derivative of heparin with a molecular weight of 2,500-4,000 daltons having anticoagulant activity obtained by a depolymerization process that can be done by a variety of methods (see column 4, lines 23-24) but different from that used in the present invention. Thus, such derivatives are obtained from heparin and not from a crude fucan from Phaeophyceae.

US 4,713,373 discloses xylan sulfates of low molecular weight between 2,000 and 5,000 daltons obtained by a depolymerization process and their use in therapeutics as orally active antithrombotic and hypolipaemic agents. This document is thus not related to a fucan derived from Phaeophyceae and the depolymerization process is different from that used in the present invention.

In conclusion, none of the cited prior art documents describes that low molecular weight sulfated polysaccharide fractions obtained by radical depolymerization of a fucan derived from Phaeophyceae would have a therapeutic benefit for the in vitro treatment of thrombosis or arterial restenosis. Thus, the subject matter of claims 1-12 is novel with respect to the cited prior art.

In addition, the specific properties of low molecular weight fractions of fucan obtained by radical depolymerization, and their utility in therapeutics, have never been suggested in the prior art and are therefore not obvious from the prior art.

The aim of the present invention is to provide an agent to be used in therapeutics having activity against vascular thrombosis and arterial restenosis, as mentioned in the specification at page 6 line 26 to page 7 line 7.

The anticoagulant properties of heparin are currently widely used in the treatment of thrombotic accidents. However, heparin is relatively ineffective in arterial thrombosis compared with venous thrombosis and has very significant side effects, such as hemorrhagic risks (page 2, lines 23-31).

Fucans have different interesting properties, and in particular, anticoagulant activity. However, crude fucans are not used in therapeutics because of their high molecular weight and heterogeneity that confer a poor solubility making it very difficult to obtain active and reproducible preparation. Trying to overcome such problems, polysaccharide fractions with low molecular weight have been generated, but it has been shown that those derived from heparin (LMWH) are ineffective against restenosis after angioplasty and do not abolish the hemorrhagic risks (page 3, lines 5-20).

By using a free radical depolymerization process, the inventors have surprisingly found that low molecular weight fucans which retain anticoagulant activity as shown in WO 97/08206 are effective against venous and arterial thrombosis without any major hemorrhagic risk. In

addition, low molecular weight fucans are also effective against arterial restenosis (page 7, lines 24-27 and example 2).

Consequently, based on WO 97/08206, which is the only prior art related to sulfated fucans with low molecular weight, the person skilled in the art searching for a new treatment against thrombosis with the aim to find an antithrombotic drug that does not disturb the coagulation process, would not be inclined to select an agent exhibiting anticoagulant properties to specifically avoid any hemorrhagic risk. For these reasons, the present invention as defined in the claims of record is not obvious with respect to the cited prior art.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on October 20, 2003.

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